Cabo Verde - Watershed Management and Agriculture Support

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Overview

Identification

COUNTRY
Cabo Verde

EVALUATION TITLE
Watershed Management and Agriculture Support

EVALUATION TYPE
Independent Performance Evaluation

ID NUMBER
DDI-MCC-CPV-WMAS-IND-2012-v1

Version

VERSION DESCRIPTION
Raw data for internal use only

Overview

ABSTRACT
This evaluation will investigate how adoption of drip irrigation technology, access to credit and conversion from traditional crop subsistence level farming to high value horticultural and fruit crops will impact household incomes of participating farmers distinct from non-participating farmer households. In order to fully measure the impact of these activities on farmer household income, MCC intends to conduct a post-compact evaluation which will compare the change in average household income prior to and following participation in the program. The fundamental research question to be answered is “Do the increased costs of investment in drip irrigation technology, access to credit and conversion from traditional crop subsistence level farming to high value horticultural and fruit crops increase annual agricultural production sufficient to raise participating farmer households out of rural poverty?

EVALUATION METHODOLOGY
Other (Performance Evaluation)

UNITS OF ANALYSIS
Individuals

KIND OF DATA
Sample survey data [ssd]

TOPICS

Topic	Vocabulary	URI
Agriculture and Irrigation	MCC Sector	

KEYWORDS
Irrigation, Agriculture, Farmers, Water supply investment

Coverage

GEOGRAPHIC COVERAGE
The islands of Fogo, Santo Antão, and Saint Nicholas in Cape Verde

UNIVERSE
Farmers in treatment and control areas

Producers and Sponsors

PRIMARY INVESTIGATOR(S)

Name	Affiliation
Clifford Zinnes	
Christopher Nicoletti	

FUNDING

Name	Abbreviation	Role
Millennium Challenge Corporation	MCC	

Metadata Production

METADATA PRODUCED BY

Name	Abbreviation	Affiliation	Role
Millennium Challenge Corporation	MCC		Metadata producer

DATE OF METADATA PRODUCTION
2015-01-15

DDI DOCUMENT VERSION
Version 1.0 (January 2015)

DDI DOCUMENT ID
DDI-MCC-CPV-WMAS-IND-2012-v1

MCC Compact and Program

COMPACT OR THRESHOLD
Cabo Verde

PROGRAM
The Water Management and Services component (WMAS), implemented over the period of 2005 through 2010, had as its main purpose to increase farmer incomes by encouraging a switch to higher-valued crops in horticulture and fruit. The main tool for this was expansion of access to irrigation in watersheds on the islands of Fogo, Santo Antão, and Saint Nicholas in Cape Verde. The primary intervention comprised waterworks (reservoirs, dikes, capture ponds, and primary and secondary conduits); agricultural extension (demonstration drip-irrigation systems and five courses on management, production, and marketing), microcredit. Cape Verde suffers from very limited rainfall and very limited arable land. Only 10% of the land is arable (9.7% of 4,033 square kilometers) and a short rainy period (August to October), marked by torrential downpours, results in roughly 83% of rainfall being lost through evaporation and runoff. Agricultural productivity is low; therefore, approximately 85% of the country's food is imported. In addition, Cape Verde suffers from adverse cost competitiveness owing to geographic discontinuity and a small population (450,000 people spread over nine inhabited islands), which results in redundant capital costs, high factor costs of production, and a lack of economies of scale. Upon completion of joint United States Geological Service (USGS) and MCC due diligence studies of the Watershed Management and Agricultural Support Project, it was determined that there was a potentially high risk of salt water intrusion into Cape Verde fresh water aquifers of the project intervention zones due to the number and placement of planned production wells for the provision of water in support of drip irrigation activities to participating farmers. In order to mitigate the risk of salt water intrusion into fresh water aquifers, the Project ($12.0 million; equivalent to 10.9% of $110,078,488 Compact) was re-structured in February 2008 to construct twenty-eight surface water catchment reservoirs throughout the three intervention watersheds (Paul, Faja and Mosteiros) for the capture and distribution of rain, spring and well fed fresh water resources.

MCC SECTOR
Agriculture and Irrigation (Ag & Irr)

PROGRAM LOGIC
The project aimed to help farmers overcome critical constraints to access a growing market opportunity for high value-added fruits and vegetables for both the domestic and local tourist markets. Project investments focused on increasing the capture, storage and distribution of spring fed and rain fed water resources, thus enabling farmers to irrigate their fields

and increase agricultural productivity. Increases in irrigated land and increasing water supply reliability were intended to facilitate a shift from low-value rain-fed subsistence agriculture (corn and beans) to high value horticultural and fruit crops. The project included the following activities: 1) Water Management and Soil Conservation Activity: Twenty-eight (28) reservoirs and forty-eight (48) capitation, retention, capitation dikes and retention dams were constructed (100% of end-of-compact target completed) to capture water, recharge water tables and decease soil erosion. Reservoirs were intended to supply a reliable source of rain fed, spring fed and well fed water for the drip irrigation of 111.2 hectares for 337 farmers in three of the four islands with the highest agricultural potential for contributing to national food security. An estimated 1,685 beneficiaries were expected to be directly impacted by drip irrigation activities. 2) Agribusiness Development Services Activity: Applies technical and field research; training for farmers and extension agents; improvements in agricultural extension centers and farm demonstration sites; building capacity in export requirements; construction of a post-harvest center for providing training, grading, packaging, cooling and inspection services to farmer households. 549 farmers were provided with technical assistance and training (68.6% of end-of-compact target completed) in five core agricultural disciplines. Rural extension centers (3) were modernized offering farmers access to internet and technical training materials. Millipede research was instrumental in lifting a 25 year embargo on inter-island agricultural exports from Santo Antao enabling the construction of a post-harvest center providing training, grading, packaging, cooling and inspection services to 31,776 farm households. 3) Access to Credit Activity: Provision of technical assistance to increase operational and financial sustainability of participating microfinance institutions in supporting the demand for rural agricultural credit for financing drip irrigation, working capital, and agribusiness investment in the three watershed intervention zones. Four “strengthened” participating micro-finance institutions (MFI) provided two hundred and nine (209) farmers and/or agribusinesses with USD 584,829 in rural loans at competitive market rates. Financial incentives (10% discount for each on time payment) were offered to farmers and/or agribusinesses that provide timely and/or early loan repayment. The Ministry of Agriculture collaborated with MFI's to assist farmers in the development of business plans and provide direct technical assistance for the implementation of agricultural capital investments. According to the theory of change, participating farmers are expected to experience an increase in their agricultural productivity by a) converting from traditional corn and bean crop production to high value horticultural and fruit products, b) converting to drip irrigation to increase the number of crop cycles and tons harvested per hectare per year and c) reducing post-harvest losses, resulting in project- wide increases in household income from farm profits and wages directly benefiting an estimated 1,685 members of the three intervention watersheds.

PROGRAM PARTICIPANTS

Farmers in treatment zones

Sampling

Study Population

Farmers in treatment and control areas

Sampling Procedure

The sampling frame comprises several districts from one watershed on each island. Approximately 21 farmer groups (the primary statistical unit or PSU) received access to irrigation, each with 5 to 10 farmers (the secondary sampling unit or SSU) per PSU. Neither the locations for the intervention nor assignment of locations to treatment and comparison were selected randomly by project designers. Treatment zones were chosen based on their suitability for new infrastructure; comparison zones were chosen based on expert opinion on what constituted comparable counterfactuals along relevant dimensions (see below). Hence, in addition to the need to correct for potential selection bias, the external validity of the evaluation will be limited to other similar locations. On the other hand, since censuses were administered, there would be no sampling error. The intended stratification was by island (watershed) and head-of-household gender.

Deviations from Sample Design

The agency contracted to carry out the surveys consistently failed to collect key data properly and the consultant hired to assess data quality did not detect this failure, leading to a re-worked evaluation design and sampling plan. This was developed using a multi-site hierarchical design to meet generally accepted levels of rigor: a statistical power of 80 percent at a level of significance of 5 percent, assuming that site and farmergroup effects together capture 70 percent of impact variance. Under a fixed-effects design, a minimum detectable effect size (MDES) of 20 percent would be achievable (US$1,000 spread over a 5-year period, or about $200 per year). Here, just 5 treated and 5 (synthesized) comparison farmers (SSUs) per PSU would be needed for a total sample size of 210. Under a randomeffects design (with a treatment effect variance of 5 percent), a MDES of 22-25 percent should be achievable. Here, an equal number of 8-10 treated and (synthesized) comparison farmers would be required for a total sample size of 336 to 420. These power calculations indicate that while overall impacts could be inferred for a sample pooled across the three watersheds, the only detectable disaggregated impact for this MDES range would be the overall impact on Santo Antão. Analogous power calculations find that gender-specific impacts could only be detected in a fixed-effects specification at an MDES of 24 percent and if the sample were pooled across the three watersheds. These results are due to the limited size of the comparison group and relatively lower number of female heads of household in the sample.

Questionnaires

Overview

The original design of the cyclical surveys did not permit some of the key priorities of the MCC (such as gender impact) to be addressed and was sub-optimal with regard to the size and extent of the comparison group. Therefore, the cyclical surveys were dropped completely as a source of evaluation baseline data and instead the evaluation used the relevant data from the Baseline Agricultural Census and Socioeconomic Census of 2006. In 2013 a single survey instrument that combined the relevant questions from these two baseline censuses was administered for the evaluation endline.

Data Collection

Data Collection Dates

Start	End	Cycle

Questionnaires

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Data Collectors

Name	Abbreviation	Affiliation
Instituto Nacional de Estatística de Cabo Verde	INE	Cape Verde

Data Processing

No content available

Data Appraisal

No content available